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## Notes on *Dicrurus m. modestus* (Hartlaub) and remarks on the *modestus* and *adsimilis* groups of drongos

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**Abstract.** Life history notes on *Dicrurus m. modestus* are summarized. Comparisons of plumage and mensural characters (wing, tail, bill, tarsus) confirm that *modestus* is an intermediate form of *atactus* (Upper Guinea forest) and *coracinus* (Lower Guinea). However, a striking difference in the wing underside appears between the *modestus* group (including *modestus*, *atactus* and *coracinus*) and *D. adsimilis divaricatus*. Chapin (1954) had already noted that *divaricatus* and *coracinus* behave rather as distinct species than as subspecies. Further ecological studies are needed before the present taxonomic treatment can be modified.

**Key words.** Aves, Dicruridae, *Dicrurus modestus*, life history, taxonomy.

### Introduction

*Dicrurus m. modestus*, confined to Principe Island in the Gulf of Guinea was discovered by Carl Weiss (who was collecting in Equatorial Africa for the Hamburg Museum) and described by Hartlaub in 1848. The first details on its general habits were published by M. Dohrn (1866) who spent about 6 months on the island in 1865—1866. A number of specimens were obtained between 1883 and 1895 by the Portuguese Francisco Newton for the Museum in Lisbon and in 1901 by the Italian Leonardo Fea. Unfortunately, these collectors left practically no fieldnotes (Bocage 1903, Salvadori 1903). In February 1909, Boyd Alexander spent about 10 days on Principe. Concerning the drongo, he wrote only a few remarks in his diary (Bannerman 1914). In 1928—1929, José Correia, commissioned by the American Museum of Natural History, worked in S. Tomé and Principe for 2 years and came back to New York with 31 skins; fortunately, he had noted the size of his specimens' gonads on the back of its labels. In 1949, D. Snow stayed on Principe for a month and published (1950) most valuable notes on the calls and habits of *Dicrurus modestus*.

First I will summarize the available data on ecology, habits, and breeding conditions of the bird, together with the observations I made in the course of half a dozen visits to Principe from 1970 to 1974. Then I will compare the morphology of the African drongos inhabiting Principe Island and various parts of the African continent (3 subspecies, *Dicrurus m. modestus*, *D. m. coracinus* and *D. m. atactus*) and deal with the relationship and taxonomic status between the *modestus* group of Principe Island and the continental *adsimilis* group.

Principe Island is situated between latitudes 1°30' and 1°42' and covers 139 km<sup>2</sup>. It is thickly wooded with cocoa plantations, especially in the northern half. Coconut palms are cultivated in the south. The slopes of the central mountains (Pico 960 m) are covered with dense primary forest. There are two rainy seasons: from mid-January to the end of May or the beginning of June, and from the beginning of September to the end of November or the beginning of December. The long dry season (gra-

vana) lasts from the end of the first rains to the end of August when heavy rains start abruptly. The short dry season (gravanito) with a lesser amount of precipitation lasts from mid-December to mid-January.

### Distribution of *Dicrurus modestus*

Keulemans (1866) found *D. m. modestus* fairly abundant, often in pairs or groups of three to eight. These birds, he noted, behaved like tame birds, flying around the church at the edge of the village S. Antonio, often sitting on the cross at the tower top. In 1949, D. Snow (1951) found them still common. He noted their presence not only in the northern half of the island but also in the coconut plantations in the southern part. I myself met them in practically all types of vegetation: patches of primary forest below the altitude of 600 m, dense secondary forests, plantations, and also sparsely wooded clearings around isolated farms. Unfortunately, I was prevented from searching for them at higher altitudes in the central mountains. My impression was that the nominate race was no longer as abundant as it had been in the past and that it had become more wary. However, its wide presence suggests an extension of the ecological niche which embraces all possible habitats and, as we shall see later, a great variety of animal food.

### General habits

The Principe drongo hunts insects in flight, as documented for all representatives of the genus. Occasionally, I saw it pouncing on insects from a branch only 4 or 5 m from the ground. As already noticed by Keulemans and Dohrn, it looked somewhat indolent, with less burst of speed, less impetus than its continental counterparts such as *D. adsimilis*. It appeared fond of perching, often in pairs, on defoliated branches at the tree tops and remaining motionless for long periods, as generally observed in all *Dicrurus* species.

### Call

Keulemans described the call as “unmusical”, more similar, he said, to the cry of a cat than to that of a bird, and unpleasantly impressive.

I heard this call only once in a patch of secondary forest at the altitude of 400 m. At first I was unable to imagine which sort of animal, hidden in the foliage above my head, could utter such a powerful and, at the same time, dissonant, nearly awful sound. Finally I discovered its producer, sitting on a high branch. I must insist on the nearly frightening “music” of this vocalization, which made me think that the vernacular name of the bird — a Feticeira, the witch — may well have been suggested by its most unpleasant cry.

### Food

Keulemans saw the bird capturing grasshoppers. In dissected stomachs D. Snow found insects. J. Derron, who kindly analyzed various stomach contents obtained by myself, not only found Orthoptera but also Lepidoptera, Diptera, Hymenoptera (with some pieces of bark).

### Nest

Keulemans described the nest as a structure of interlocked thin twigs and rootlets, attached between the boughs of a tree. This is the wellknown type of a drongo nest as is found in continental Africa. In Principe Island, in spite of much searching, I did not discover any nests. The size and the colour of the eggs are still unknown.

### Breeding Season

According to Dohrn (1866) and Keulemans (1866), *D. m. modestus* builds its nest in September, and the breeding season lasts until January. Judging from the size of the gonads and taking into account the stages of moulting, the timing of their breeding can be assessed. All available data are assembled in Tab. 1, confirming the information given by Dohrn and Keulemans. The egg-laying period obviously starts at the end of September or in early October and extends at least until the end of December (the middle of the short dry season).

Table 1. *Dicrurus m. modestus* — reproduction and moult data (the first two observations by Correia, the remaining by the author).

Date	Males	Females	Size of gonads	Moult	Breeding condition
Aug. 17–Sept. 25	14	16	small		
Sept. 27	2		enlarged		
Nov. 5		1	small (swelling)		
Nov. 6–7	3		enlarged		breeding condition
Dec. 17–18	2		greatly enlarged		breeding
	2		enlarged		breeding condition
		2	enlarged		breeding condition
		1	small		
		1			after laying (presumably mid-December)
Jan. 12		1	small		
March 3	1		small		
March 15	1		small	yes	
July 2		1	small	yes	

### Relationship of *D. m. modestus* to *D. m. atactus* and *D. m. coracinus*

Excellent descriptions of drongos of western and equatorial Africa have been published by various authors (e.g. Mackworth-Praed & Grant 1973). It will be sufficient here to underline both the similarities and differences between the *modestus* form (restricted to Principe) and the forms inhabiting the dense forests in Upper Guinea (*atactus*) and Lower Guinea (*coracinus*).

All these drongos have red eyes (brown when immature), strong black bills, black legs, and progressively diverging outer rectrices. In younger birds the black shafts of the undertail coverts are more or less tipped with dirty white patches. The main critical characters for identification are: the colour of the mantle as contrasted with that of the head and nape; the colour and relative darkness of the flight feathers, especially the inner vanes, to be seen from below as well as from above; the dimensions and proportions.



*Dicrurus m. coracinus*: the back is black with a bluish tinge: velvet, not glossy; in strong and abrupt contrast with the dark crown and nape, which are bluish and glossy. Inner webs of quills blackish, with a brownish tinge on the upper side, a greyish glossy tinge on the under side. Underparts dull bluish black.

*Dicrurus m. atactus*: dark, glossy, blue all over, the back being a little darker, but not velvet. Inner webs of quills more brownish than in *coracinus*, the underside being very glossy as though it had been covered with oil!

*Dicrurus m. modestus*: dark blue all over: less glossy than *atactus*, slightly more glossy than *coracinus*. Back dull bluish black, but neither velvet nor glossy. Inner webs of quills dark grey with a brownish tinge, moderately glossy, more like those of *atactus*. Hence suggesting an intermediate insular form, as recognized by Vaurie (1949). Fork of the tail about 25 mm.

### Dimensions

The larger size of *modestus* is well known. In order to obtain a comparative delineation of the three forms I measured series of specimens from the museums in Paris, Tring and Tervueren. The results, with ratios of tarsus and tails to wings, are presented in Tab. 2. They allow us to draw the following conclusions.

i — In all three forms the lengths of wing, tarsus, tail and bill are slightly shorter for females than for males.

ii — These same lengths and the ratios of tarsus and tail to wings are respectively the same for *coracinus* and *atactus*.

iii — *D. m. modestus* is larger (all lengths). Its tail is proportionately a little longer. Its bill is also slightly stronger: the ratio of mean bill length to mean wing length being 0,138 for ♂ and 0,135 for ♀, as against 0,12 for both sexes of *coracinus* and *atactus*, the ratio of bill length to tarsus length being 0,86 for ♂ and 0,84 for ♀ as against 0,75—0,775 for ♂ and ♀ in *coracinus*, *atactus* and *divaricatus*. This peculiarity was to be expected for an insular form which is not only the unique representative of the genus but also has no closely related ecological counterpart.

### Remarks on affinities and possible phylogeny

1 — Serle (1950, 1954, 1957) and Chapin (1954) already pointed out that *atactus* and *coracinus* are merging in their zone of sympatry (Brit. Cameroon). Examining the British Museum collection I could convince myself that several specimens from this region are difficult to assign either to *coracinus* or to *atactus*. They are less velvet black than *coracinus* and less uniformly metallic blue than *atactus*, resembling *modestus*. An attractive hypothesis would be that the isolated *modestus* is closer to the ancestral one — the “pro-drongo” — which produced the two subspecies inhabiting now the Upper and Lower Guinea forests.

2 — Comparing the insular *modestus* with its continental counterpart, *D. adsimilis divaricatus*, whose measurements are given for a few skins in Tab. 2, I noticed the striking difference in the coloration of flight feathers and their inner webs, especially on their underparts: they are brown — instead of black or greyish black; and they are much brighter than either those of *coracinus* or those (as far as I could ascertain)

Table 2. Measurements (in mm) and indices of various dimensions of *Dicrurus* spp.; sample sizes and means in parentheses; W = wing, B = bill from nostrils, T = tarsus, Q = tail.

<i>Dicrurus modestus modestus</i>			
Males		Females	
W (14) :	131—145 (138)	W (11) :	132—139 (133,5)
B ( 4) :	17,5—19 (18,5)	B ( 4) :	17,5—19 (18,5)
T (11) :	20,5—24 (21,5)	T ( 6) :	20—23,5 (22)
Q (11) :	115,5—134,5 (125)	Q (11) :	116,5—127 (121,5)
T/W (10) :	0,15—0,17 (0,16)	T/W ( 6) :	0,15—0,18 (0,16)
Q/W (13) :	0,835—0,975 (0,905)	Q/W (11) :	0,88—0,95 (0,91)
B/W ( 4) :	0,134	B/W ( 4) :	0,138
B/T ( 4) :	0,86	B/T ( 4) :	0,84
<i>Dicrurus modestus coracinus</i>			
W (18) :	120—135 (128)	W (12) :	122—130 (126)
B (11) :	14—17 (15,5)	B (12) :	14—16 (15,2)
T (19) :	18—22 (20)	T (11) :	19—22,5 (20)
Q (17) :	102—117 (110)	Q (12) :	105—113,5 (109)
T/W (18) :	0,145—0,175 (0,16)	T/W (11) :	0,15—0,18 (0,16)
Q/W (17) :	0,785—0,915 (0,86)	Q/W (12) :	0,84—0,915 (0,87)
B/W (11) :	0,121	B/W (12) :	0,120
B/T (11) :	0,775	B/T (12) :	0,76
<i>Dicrurus modestus atactus</i>			
W (12) :	120—138 (128)	W ( 8) :	120—132 (125)
B ( 9) :	11,5—17 (15,5)	B ( 9) :	14—16 (15,0)
T (11) :	20—21 (20,5)	T ( 9) :	19—20,5 (20)
Q (11) :	104—116 (110)	Q ( 9) :	103—114 (107)
T/W (11) :	0,15—0,175 (0,16)	T/W ( 8) :	0,15—0,165 (0,16)
Q/W (11) :	0,82—0,90 (0,855)	Q/W ( 8) :	0,83—0,925 (0,86)
B/W ( 9) :	0,121	B/W ( 8) :	0,120
B/T ( 9) :	0,755	B/T ( 8) :	0,75
<i>Dicrurus adsimilis divaricatus</i>			
W ( 3) :	123—132 (127)	W ( 3) :	119—129 (125)
B ( 3) :	14,5—17 (15,2)	B ( 2) :	15, 16
T ( 3) :	18,5—21 (20)	T ( 3) :	19—21 (20)
Q ( 3) :	112—122 (115)	Q ( 3) :	102—109,5 (107)
T/W ( 3) :	0,14—0,165 (0,15)	T/W ( 3) :	0,155—0,165 (0,16)
Q/W ( 3) :	0,88—0,925 (0,905)	Q/W ( 3) :	0,84—0,87 (0,855)
B/W ( 3) :	0,124	B/W ( 2) :	0,120
B/T ( 3) :	0,76	B/T ( 2) :	0,775

of *atactus*: a feature exhibited when the birds flap their wings; and a character more important in the field than the lesser tail depth in *D. a. divaricatus*.

The comments of Chapin (1954 p. 10): “. . . This very distinct race *coracinus* . . . in Uganda and Kavirondo . . . overlaps in range with *D. a. adsimilis*, the bird of more open savannas, and is not known to interbreed with it. The Upper Guinea race, *atactus*, may well be considered as a hybrid population, and occasional intermediates, indistinguishable from *atactus*, have been collected in northern Angola, the region of Ruzizi valley and near the Uelle river. In the main, however, *coracinus* behaves in

the Congo like a distinct species. It seldom invades the lower levels of the rain forest but is fond of the largest trees about the edges of the clearings, dominating the second growth . . . In the Uelle district *coracinus* and *divaricatus* look and act more like different species than like races . . .” were an incitement for me for retaining the ancient nomenclature — *Dicrurus modestus* ssp. and *D. adsimilis* ssp. — until ecological conditions, behaviour and morphologies in the overlapping zones will be better understood<sup>1)</sup>.

The wing colorations of the two drongo groups give raise to several questions. What is the signal function of the underwing coloration of *D. a. divaricatus*? Are there true mixed populations along the edges of the rain forest within the partly deforested, narrow transition zones where *coracinus* and *atactus* come into contact with *adsimilis*? Is there a clinal sequence of coloration patterns? In this case we have to accept the taxonomic treatment adopted by Vaurie (1949, 1962): only one species *D. adsimilis*, with three subspecies — instead of two species: *adsimilis* and *modestus*.

### Zusammenfassung

Der Drongo *Dicrurus modestus* wurde zwischen 1970 und 1974 auf der Insel Principe beobachtet. Eigene und in der Literatur vorhandene Beobachtungen zur Naturgeschichte der Art werden zusammengestellt. Ein Vergleich von Gefiedermerkmalen und Körpermaßen zeigt, daß die Form *modestus* zwischen den auf dem afrikanischen Festland vorkommenden *atactus* und *coracinus* vermittelt. Eine deutliche Differenz in der Färbung der Flügelunterseite besteht aber zwischen der *modestus* Gruppe (*modestus*, *atactus* und *coracinus*) und *D. adsimilis divaricatus*. Bereits Chapin (1954) notierte, daß sich *coracinus* und *divaricatus* eher wie Arten denn wie Unterarten verhalten. Weitere ökologische Studien sind notwendig, um dieses taxonomische Problem zu lösen.

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1) Also see Meise (1968 p. 46—49): „Heute ist er (*D. a. divaricatus*) . . . auf so weitem Gebiete . . . in gleichen Distrikten wie *modestus* (*D. modestus coracinus*) gefunden worden . . ., daß man die Bemerkung Chapins . . . (1954: 10) am liebsten noch erweitern möchte. Daher halte ich auch beide Arten . . . getrennt . . .”

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